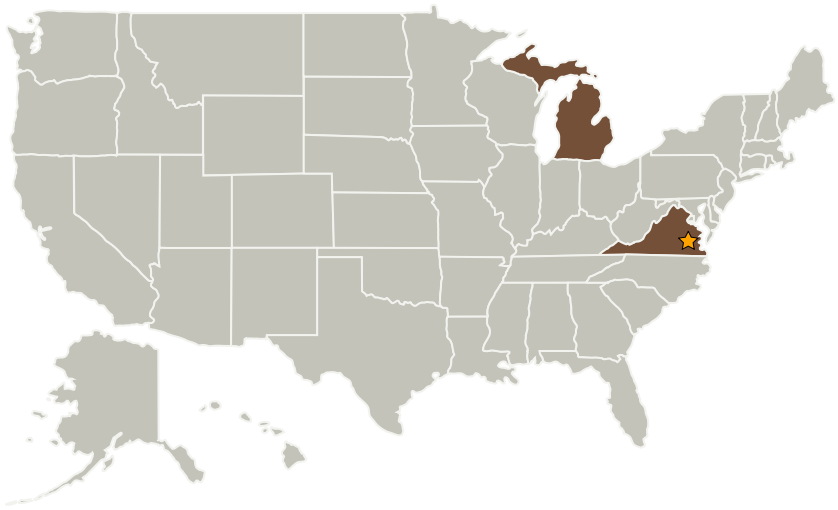
Three Dimensional Volumetric Terahertz Scanning for Aerospace Non Destructive Evaluation, Phase I

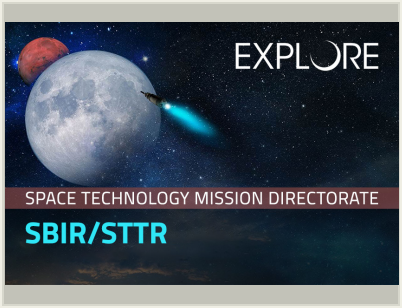
Completed Technology Project (2004 - 2005)

Project Introduction

In this Phase I STTR project, we propose to develop the critical innovations necessary for a high speed three dimesnional terahertz (THz) tomographic imaging system for aerospace non destructive evaluation (NDE) applcations. NASA and the Aerospace industry are beginning to utilize THz reflection imaging (for example, examining the space shuttle external tank sprayed on foam insulation for voids and disbonds). THz NDE imaging is widely applicable to composite resin, ceramic, plastic, natural, and other non-metallic materials. Current commercial equipment is capable of two dimensional raster scanning. The wider utility of THz NDE technology can be more fully exploited for the development of NASA and aerospace applications if the full potential for high speed three dimensional THz imaging is realized. The current state of the art equipment collects the THz waveform reflection from a very narrow depth range from a strongly reflective backing. The proposed innovations will increase the dynamic range of the THz waveform acquisition to allow collection of reflections from weaker interfaces, and will increase the window of high speed scanning of the THz waveform to allow three dimensional images to be reconstructed for objects many inches thick.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Picometrix, LLC	Supporting Organization	Industry	Ann Arbor, Michigan

Primary U.S. Work Locations	
Michigan	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.5 Nondestructive Evaluation and Sensors